<8mm by 0.39 (87.2% concordance). PLSR regression of the overall cohort identified median ST XSA and height as key predictors of graft diameter. The 95% prediction error for the overall model for a single future patient was 0.9mm. That is, predicted graft diameters of 8.92mm or above would have a 2.5% chance of being <8mm in theatre.
Discussion: The ability to predict graft diameter prior to surgery may improve surgical efficiency for ligament reconstruction, particularly if a minimum graft diameter threshold is to be achieved. Previous studies have correlated patient anthropometry and MRI XSA to intra-operative graft diameter, however this study is the first to present a validated predictive model. The results identify females receiving 4-STGT constructs at-risk of producing grafts <8mm, and this can be screened with MRI-based measurements of tendon geometry. More accurate predictive models that are easy to use provide surgeons with a useful clinical tool for surgical planning. With a future prospective study incorporating a range of intraoperative variables, this model can be further refined to increase its clinical applicability.
Conclusion: Patient height, gender and MRI cross-sectional measurements are significant predictors of graft diameter. Whilst the actual graft diameter required for each patient is a decision for the treating surgeon, this study confirms previous correlations, and proposes a novel method of stratifying and accurately predicting the likely graft diameter for each patient.
http://dx.doi.org/10.1016/j.asmart.2016.07.166

B0730
Anatomic considerations in arthroscopic reconstruction of the coraco-clavicular ligament in patients with acromio-clavicular joint dislocation

K. Matsumura [1], R. Nakajima [2], S. Imai [2]
[1]*Tane General Hospital, Japan*
[2]*Shiga University of Medical Science, Japan*

Background: Arthroscopic reconstruction of the coraco-clavicular ligament has been described in some studies. Few published reports have considered the importance of anatomic reconstruction. The present study reports the importance of anatomic reconstruction and evaluates the position of the reconstructed ligaments and the clinical and radiographic results of arthroscopic reconstruction of coraco-clavicular ligament.
Material and Methods: Arthroscopic reconstruction of the coraco-clavicular ligament using a Fiber tape and Dog Bone Button (Arthrex) was performed in 8 shoulders between June 2014 and November 2015. The mean age was 39.9 years (range, 28 to 55 years). The mean follow-up period was 9.1 months (range, 4 to 20 months). The injuries were as follows: Rockwood type 3 (n=6), Rockwood type 4 (n=1), and Rockwood type 5 (n=1). We evaluated the position of the bone tunnel on CT images, and the extent of the tunnel widening and loss of reduction using radiography. The subjective patient outcomes were evaluated.
Results: The distance from the lateral side of the clavicle to the clavicular tunnel was 28.8 ± 5.2 mm. If we divided the sagittal view of clavicle into three columns (anterior, middle, posterior), 1 shoulder was anterior, 4 shoulders were middle, and 3 shoulders were posterior. The distance from the anterior aspect of the coracoid to the coracoid tunnel was 29.2 ± 5.3 mm. Intra-operative reduction was lost in 6 patients (75%). The clavicular tunnel width was 5.5 ± 1.0 mm. The coracoid tunnel width was 5.1 ± 0.9 mm. One patient reported experiencing slight pain. The subjective patient outcomes were excellent in 6 cases and good in 2 case.
Discussion: Although our clinical results were mostly satisfactory, we experienced tunnel widening and a loss of reduction. We hypothesize that the reason for this is that the position of the bone tunnel in these studies tended to differ from the anatomic attachment of the coraco-clavicular ligament; thus, we could not reconstruct the coraco-clavicular ligament in the anatomic position.
Conclusion: Arthroscopic reconstruction of the coraco-clavicular ligament is recommended in patients with acromio-clavicular joint dislocation. However, in order to decrease the enlargement of the bone tunnel and the loss of reduction, it was suggested that we should reconstruct the bone tunnel in the anatomic position.
http://dx.doi.org/10.1016/j.asmart.2016.07.167

B0743
Prognostic factors of retear after arthroscopic repair of massive rotator cuff tear

T.-Y.M. Ong [1], S.-H.P. Yung [2], C.-K. Lo [1], T.-C. Wong [2], K.-M. Chan [2]
[1]*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital, Hong Kong*
[2]*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong, Hong Kong*

Introduction: Retearing after arthroscopic repair of massive rotator cuff tear has been reported to range from 20% to 60%. This study aimed to evaluate the possible prognostic factors relating to retear of repaired massive tears of rotator cuff.
Materials and Methods: A total of 24 patients underwent arthroscopic repair of massive tears of rotator cuff during the period of 2009-2012, was assessed and reviewed, with clinical signs and functional assessment with UCLA and ASES score as the assessment criteria, as well as pre- and postoperative magnetic resonance image (MRI) assessment performed. The following factors were compared between the intact group versus retear group for final analysis: age of patient, smoking, diabetes mellitus (DM), history of significant trauma to the shoulder, presence of subscapularis tear, long head of the bicep tendon condition, delamination, size of tear, and presence of significant muscle atrophy (preoperative MRI).
Results: With a mean follow-up of 32 months among this 24 patients (mean age, 55 years), MRI revealed a complete retearing in 4 (17%) cases and partial retearing in another 4 (17%) cases. Patients with complete retear was significantly older than the group without tear. None of the patient with a history of trauma got retear or partial retear. The retearing rate of patients with either DM, LHB tear requiring tenotomy, or subscapularis tear requiring repair were significantly higher than those without them.
Discussion and Conclusion: Older age, DM, presence of LHB tear requiring tenotomy or subscapularis tear requiring repair are relative poor prognostic factors for retearing of repaired massive rotator cuff tear.
http://dx.doi.org/10.1016/j.asmart.2016.07.168

B0746
Altered three-dimensional knee kinematics during step and turn are associated with patient-reported outcomes following multiple-ligament knee reconstruction

C. Scholes [1,2], M. Ebrahimi [1,2], B. Fritsch [1,2], D. Parker [1,2]
[1]*Sydney Orthopaedic Research Institute, Chatswood, Australia*
[2]*Faculty of Medicine, University of Sydney, Australia*

Background: Multiple-ligament knee injury is devastating to patient function and a challenge for the orthopaedic surgeon. Considering the important role the biomechanics of the knee may have for overall patient function and its known contribution to long-term joint degeneration, detailed knowledge of knee function following multiple-ligament reconstruction (MLKR) could provide an important adjunct to post-operative rehabilitation and management. However, the biomechanical function of MLKR knees remains largely unknown. Previous work by our group has identified altered knee kinematics in MLKR patients compared to healthy controls during level walking, although the ability of patients to negotiate a more challenging task, such as step descent with a turning movement, is yet to be examined. To address this gap in the current knowledge, the purpose of this study was to i) determine differences in knee kinematics during a step and turn task between MLKR knees and matched healthy controls and ii) establish the relationship between knee kinematics and IKDC score in patients that have undergone MLKR.
Materials & Methods: Gait analysis was performed on 21 patients that had undergone MLKR a minimum of 12months prior. A second group of healthy participants ($N = 17$) was matched for gender, as well as within ±10% of height, weight and age. Retroreflective markers were attached to anatomical landmarks of the feet, lower limbs and pelvis (Cleveland Clinic marker set), supplemented by marker clusters attached to the middle of the thighs and calves. Following familiarisation trials, volunteers were recorded with a high-speed optoelectronic camera system (200Hz, Motion Analysis Corp, USA) while descending from stairs onto the floor, leading with the reconstructed limb and stepping over the lead foot with the contralateral limb to land at 90° to the original direction of travel. Volunteers were instructed to land with their lead foot placed parallel to the direction of travel prior to contralateral toe-off from the step. Three-dimensional knee angles and foot progression angle at initial foot contact, as well as range of motion during weight acceptance from initial contact to contralateral foot contact were extracted from each of 10-12 trials. Patients were compared to their matched control using a single-case approach with unpaired Student t-tests, while partial least squares regression was used to associate knee kinematics with IKDC and KOOS scores within the MLKR group.
Results: A sample of 13 males and 8 females were recruited, with an average period from surgery to follow-up of 5.4yrs (IQR 2.2 − 9.8). The control group was successfully pair-matched, with no significant differences between MLKR and control groups for age at follow-up, height, weight or BMI. Injury patterns were also variable between patients, with an incidence of 12.5% and 6% for nerve injury and vascular injury respectively, as well as meniscal repair or meniscectomy (25%). In addition, more than half the sample suffered other injuries, including fractures of the lower limbs and pelvis.
The MLKR group exhibited significantly ($p=0.001$) increased external rotation and significantly ($p=0.031$) increased flexion of the knee at initial foot contact. During weight acceptance, MLKR patients displayed significantly ($p=0.019$) increased internal rotation, although no significant difference in knee range of motion in any plane were observed during the entire pivoting movement. When compared on a single-case basis, 65% of patients landed with significantly greater knee flexion ($P < 0.05$), increased varus (47%) or valgus (47%), or increased external tibial rotation (82%) at initial ground contact. Similar patterns were observed for knee range of motion during weight acceptance, with MLKR patients displaying significantly reduced flexion (59%), frontal motion (47%) and increased internal rotation (59%). Regression analysis revealed that step and turn kinematics (frontal angle at initial contact and frontal range of motion during weight acceptance) were significantly associated with IKDC score ($R^2_{pred} = 0.83$, $P<0.01$) in the MLKR group. The amount of valgus at initial foot contact was positively associated with improved scores, with patients landing with a varus knee returning poorer scores.
Discussion: The functional mechanics of the knee following MLKR remain largely unknown. The current study presents the first detailed insight into the knee kinematics during a strenuous task such as a step descent and turn. The results suggest that MLKR patients employ different knee kinematics during step descent to prepare for a pivoting action. Although MLKR patients landed with a more toe-out pattern compared to healthy controls, which may have explained differences in knee rotation, MLKR patients also displayed differences in frontal angle at initial contact and frontal range of motion during weight acceptance. The degree of knee valgus at initial contact was positively associated with IKDC and KOOS scores; however the mechanisms explaining this relationship remain unclear. These results suggest that frontal alignment over the short-medium term is important to patient-reported outcomes of MLKR. Future work will focus on understanding the pre-operative and peri-operative factors that determine knee functional patterns and outcome during ongoing management.